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CLAIMS:

1 1. A method for processing raw data streams carrying a plurality of raw data objects
2 containing information which is subject to periodic updates, the method comprising the steps of:
3 receiving a raw data object carried on a raw data stream input;
4 determining an object type of the raw data object;
5 generating a formatted data object based on the contents of the raw data object by
6 applying a set of formatting rules;
7 determining if a prior version of the formatted data object is present in an object storage
8 pool;
9 if a prior version is present in the object storage pool:
10 determining a data differential between the formatted data object and the prior
11 version;
12 updating the prior version of the formatted data object to correspond with the
13 generated formatted data object; and
14 broadcasting the data differential on an output broadcast data channel;
15 otherwise, if no prior version is present in the object storage pool;
16 providing the formatted data object to subscriber processes; and
17 storing the formatted data object in the object storage pool.

1 2. The method of claim 1, wherein the formatted data object stored in the object
2 storage pool has an associated sequence number;

the step of updating comprising the step of incrementing the sequence number of the formatted data object;

the step of broadcasting the data differential including broadcasting the sequence number associated with the formatted data object.

3. The method of claim 1, wherein the step of providing the formatted data object comprises broadcasting the formatted data object on the output broadcast channel.

4. The method of claim 1, wherein the broadcast channel is selected from a plurality of broadcast channels according to the object type.

5. The method of claim 1, wherein the applied formatting rules are selected in accordance with the determined object type.

6. The method of claim 1, further comprising the step of translating the raw data object into a raw event comprising at least one name-value pair prior to performing the steps of determining an object type of the raw data object and generating a formatted data object.

7. The method of claim 1, further comprising the steps of:
validating the contents of the raw data object; and
upon a failed validation, preventing subsequent broadcast of the data differential or formatted data object derived from the respective raw data object.

1 8. The method of claim 1, further comprising the steps of:
2 receiving a particular formatted data object at a subscriber process;
3 storing the received formatted data object in a database associated with the subscriber
4 process;
5 receiving at the subscriber process a data differential for the particular formatted object
6 via the broadcast data channel; and
7 updating the stored formatted data object in accordance with the received data
8 differential.

1 9. The method of claim 8, wherein the broadcast data channel is received by a
2 plurality of subscriber processes.

1 10. The method of claim 8, wherein the subscriber processes receives a plurality of
2 broadcast channels.

1 11. The method of claim 8, further comprising the step of communicating information
2 about the formatted data object stored in the subscriber database to a remote location.

1 12. The method of claim 1, wherein the raw data object comprises information related
2 to a financial product offering.

1 13. A method for processing a raw data stream generated by a financial product
2 provider and carrying a plurality of raw data objects containing information related to financial
3 product offerings and subject to periodic updates, the method comprising the steps of:
4 receiving a raw data object carried on a raw data stream input;
5 determining an object type of the raw data object;
6 generating a formatted data object based on the contents of the raw data object by
7 applying a set of formatting rules selected in accordance with the determined object type;
8 determining if a prior version of the formatted data object is present in an object storage
9 pool;
10 if a prior version is present in the object storage pool:
11 determining a data differential between the formatted data object and the prior
12 version;
13 updating the prior version of the formatted data object to correspond with the
14 generated formatted data object; and
15 incrementing a sequence number associated with the formatted data object; and
16 broadcasting the data differential and the sequence number on an output broadcast
17 data channel selected from a plurality of broadcast channels according to the object type;
18 otherwise, if no prior version is present in the object storage pool;
19 providing the formatted data object to subscriber processes; and
20 storing the formatted data object and an associated initial sequence number in the
21 object storage pool.

1 14. The method of claim 13, wherein the step of providing the formatted data object
2 comprises broadcasting the formatted data object on the output broadcast channel.

1 15. A system for processing raw data streams carrying a plurality of raw events
2 containing information which is subject to periodic updates, the system comprising:
3 an information manager receiving the raw data streams as input;
4 a processing database connected to the information manager and having object typing and
5 formatting rules stored therein; and
6 an object storage pool connected to the information manager;
7 the information manager configured to:
8 receive a raw data object carried on a particular raw data stream input;
9 identify an object type of the raw data object in accordance with the object typing
10 rules;
11 generate a formatted data object based on the contents of the raw data object by in
12 accordance with the formatting rules;
13 determine if a prior version of the formatted data object is present in the object
14 storage pool and in response to a negative determination:
15 (a) provide the formatted data object to subscriber processes, and
16 (b) store the formatted data object in the object storage pool.
17 otherwise, in response to a negative determination:
18 (a) update the prior version of the formatted data object to correspond
19 with the generated formatted data object,

20 (b) identify a data differential between the formatted data object and the
21 prior version, and

22 (c) broadcast the data differential on an output broadcast data channel.

1 16. The system of claim 15, wherein the information manager is further configured
2 to:

3 associate a respective sequence number with formatted data objects stored in the
4 object storage pool;

5 increment the respective sequence number during an update to the formatted data
6 object in the storage pool; and

7 broadcast the respective sequence number with the data differential.

1 17. The system of claim 15, wherein the formatted data objects are provided to
2 subscriber processes via the output broadcast channel.

1 18. The system of claim 15, wherein the information manager is further configured to
2 select the broadcast channel from a plurality of broadcast channels according to the identified
3 object type.

1 19. The system of claim 15, wherein the information manager is further configured to
2 apply particular formatting rules selected in accordance with the identified object type.

1 20. The system of claim 15, further comprising at least one client manager connected
2 to the broadcast channel; the client manager configured to:

3 receive a particular formatted data object;
 4 store the received formatted data object in a database associated with the client manager;
 5 receive a data differential for the particular formatted object via the broadcast data
 6 channel; and
 7 update the stored formatted data object in accordance with the received data differential.

1 21. The system of claim 20, wherein the client manager is further configured to
 2 provide information related to data objects stored in the associated database to a plurality of
 3 subscribing clients.

1 22. The system of claim 20, wherein a plurality of client managers are connected to
 2 the broadcast data channel.

1 23. The system of claim 15, wherein the raw data objects comprise information
 2 related to a financial product offerings.

1 24. A system for processing raw data streams generated by respective financial
 2 product providers, each stream carrying a plurality of raw data objects containing information
 3 related to financial product offerings and subject to periodic updates, the system comprising:
 4 a translator configured to receive the raw data objects as input and generate raw events
 5 comprising a set of name-value pairs derived from data in the raw data objects;
 6 a processing database having object typing and formatting rules stored therein;
 7 an offer processor connected to the processing database and configured to, in response to
 8 the receipt of a raw event:

9 determine an object type associated with the raw event; and
 10 generate an external event containing a formatted data object derived from the
 11 contents of the received raw event in accordance with the formatting rules;
 12 an object storage pool configured to store a plurality of formatted data objects therein;
 13 an offer pool manager connected to the object storage pool and configured to, upon
 14 receipt of an external event:
 15 (a) determine if a prior version of the formatted data object is present in an object
 16 storage pool;
 17 (b) if a prior version is present in the object storage pool:
 18 determine a data differential between the formatted data object and the prior
 19 version,
 20 update the prior version of the formatted data object to correspond with the
 21 generated formatted data object, and
 22 broadcast the data differential on an output broadcast data channel;
 23 (c) otherwise, if no prior version is present in the object storage pool:
 24 provide the formatted data object to subscriber processes, and
 25 store the formatted data object in the object storage pool.

1 25. The system of claim 24, wherein the offer pool manager is further configured to:
 2 associate a sequence number with the formatted data object stored in the object storage
 3 pool;
 4 increment the sequence number upon updating the formatted data object; and
 5 broadcast the sequence number associated with the formatted data object with the data
 6 differential.

1 26. The system of claim 24, wherein the offer pool manager is configured to provide
2 the formatted data object by broadcasting the formatted data object on the output broadcast
3 channel.

1 27. The system of claim 24, wherein the offer pool manager is configured to select
2 the broadcast channel from a plurality of broadcast channels in accordance with the object type.

1 28. The system of claim 24, wherein the offer processor is configured to apply
2 specific formatting rules in accordance with the determined object type.

1 29. The system of claim 24, the processing database further having object validation
2 conditions stored therein;
3 the offer processor being further configured to validate the contents of the raw data object
4 in accordance with selected validation conditions.

1 30. The system of claim 24, wherein the object typing and formatting rules are stored
2 in a tree format;
3 the tree having a root node and at least one descendant stream nodes, each stream node
4 being associated with a specific raw data stream;
5 each stream node further having at least one type leaf node descending therefrom, each
6 type leaf node being associated with a specific object type carried by the raw data stream
7 associated with the respective stream node;

8 each type leaf node having at least one associated object typing rule for identifying
9 objects of the type associated with the respective type leaf node.

1 31. The system of claim 30, wherein each type leaf node further has at least one
2 associated formatting rule.

1 32. The system of claim 24, further comprising at least one client manager in
2 communication with the information manager;

3 the client manager configured to:

4 receive a particular formatted data object from the offer pool manager;

5 store the particular formatted data object in an associated client manager
6 database;

7 receive a data differential for the particular formatted object via the
8 broadcast data channel; and

9 update the stored formatted data object in accordance with the received
10 data differential.

1 33. The system of claim 32, wherein the client manager is further configured to
2 communicate information about the formatted data object stored in the subscriber database to a
3 remote location.

1 34. The system of claim 24, wherein the raw data object comprises information
2 related to a financial product offering.

In the Claims

1. (Currently Amended) A method for delivering data objects containing data subject to periodic updates to a plurality of clients via a data communication network, the method comprising the steps of:

- connecting to at least one input data stream, each input data stream carrying a respective type of data objects and each object comprising a key which uniquely identifies the respective data object's type;
- establishing a communication session with at least one client, each client having an associated profile comprising data indicating data stream subscriptions and at least one object rule associated with the subscribed data streams;
- receiving on a particular input data stream a current state for a specific data object;
- updating an object pool cache to reflect the current state of the specific data object;
- placing a state event in a client event queue, wherein the state event is placed in a specific client event queue dedicated to each respective client to which the client event will be transmitted; and
- identifying state events to be transmitted to the respective client which are related to a common data object;
- aggregating the identified state events to thereby reduce the number of state events in the queue; and
- for each respective client subscribed to the particular input data stream, evaluating from the client profile associated with the respective client the object rules associated with the particular input data stream against the specific data

1 object and transmitting the current state of the specific data object including a
2 client event related to the current state of the specific data object, the client event
3 being derived from at least one state event extracted from the client event queue to
4 the respective client in response to a positive evaluation.

5
6 2. (Original) The method of claim 1, wherein the data objects
7 carried on the input data streams comprise differential data objects.

8
9 3. (Original) The method of claim 1, further comprising the step of,
10 after connecting to the at least one data stream, initializing the object pool cache
11 with an initial state of data objects carried on the connected at least one data
12 stream.

13
14 4. (Original) The method of claim 3, further comprising the step
15 of, after a communication session is established with a particular client,
16 delivering to the particular client a snapshot of the data objects in the object
17 pool cache associated with the data stream subscriptions in the profile
18 associated with the particular client.

19
20 5. (Original) The method of claim 1, further comprising the step
21 of:

22 in response to detecting that a particular client in a communication session
23 has subscribed to a new input data stream not in a set of connected input data
24 streams, connecting to the new input data stream.
25

1 6. **(Original)** The method of claim 5, further comprising the steps of:
2 initializing the object pool cache with an initial state of data objects
3 carried on the new input data stream; and
4 delivering to the particular client a snapshot of the data objects in the
5 object pool cache associated with the new data stream.

6
7 7. **(Cancelled)**

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9 8. **(Cancelled)**

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11 9. **(Cancelled)**

12
13 10. **(Cancelled)**

14
15 11. **(Currently Amended)** The method of claim ~~10~~ 1, where the
16 identified state events are aggregated into at most one state event.

17
18 12. **(Currently Amended)** The method of claim ~~10~~ 1, wherein the step
19 of identifying is performed by comparing an object ID in a state event to be
20 placed into the respective client event queue with the object ID of events in the
21 respective client event queue.

22
23 13. **(Previously Presented)** The method of claim 1, farther
24 comprising the steps of:
25

1 monitoring the performance of communication with each connected client;
2 and

3 dynamically adjusting the rate at which client events are transmitted to one
4 or more of the respective clients in response to the monitored performance.
5

6 14. (Original) The method of claim 13, wherein the step of monitoring
7 the performance of communication with each connected client comprises
8 determining network transmission time and a client processing time for received
9 client events.
10

11 15. (Original) The method of claim 1, wherein the data objects comprise
12 information related to financial product offerings.
13

14 16. (Original) The method of claim 1, wherein the input data streams are
15 broadcast by at least one information manager, each information manager
16 maintaining a respective object storage pool;

17 the method further comprising the steps of:

18 retrieving an initial state of data objects carried on the connected at
19 least one data stream from the object storage pool associated with the information
20 manager broadcasting the data stream; and

21 initializing the object pool cache with the retrieved initial states.
22
23
24
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1 17. (Previously Presented) A system for delivering data objects
2 containing data subject to periodic updates to a plurality of clients via a data
3 communication network, the system comprising:

4 a client session manager;

5 at least one object state manager having an associated object pool
6 cache;

7 at least one client session; and

8 a delivery manager associated with each respective client session;

9 the client session manager being configured to:

10 receive initial access communications from a client;

11 load a client profile associated with the client and comprising data
12 indicating data stream subscriptions and at least one object rule associated with the
13 subscribed data streams;

14 each object state manager being configured to:

15 connect to at least one input data stream, each input data
16 stream carrying information related to a respective type of data objects;

17 receive on the input data streams changes to states of data objects;

18 upon receipt of a state change for a specific data object on a
19 particular data stream, update the associated object pool cache to reflect the
20 changed current state of the specific data object and generate an object event
21 directed to client sessions for clients subscribed to the particular data stream
22 indicating a state change has occurred with regard to the specific data object;

23 each client session being configured to:
24
25

1 in response to the receipt of an object event, evaluate the object
2 rules associated with the particular input data stream from the respective client
3 profile against the specific data object change noticed by the object event, and

4 transmitting the current state of the specific data object to the
5 respective client in response to a positive evaluation by forwarding a state event
6 to the associated delivery manager;

7 the delivery manager comprising:

8 a client queue manager configured to place received client events on a
9 client event queue; and

10 a push module configured to retrieve state events from the client
11 event queue and send a client event derived from the state event to the respective
12 client.

13
14 18. (Cancelled)

15
16 19. (Previously Presented) The system of claim 17, wherein:

17 at least one of the client session and the push module are configured
18 to monitor the performance characteristics for communications with the
19 respective client and dynamically determine a rate at which client events should
20 be transmitted in response to the monitored characteristics;

21 the push module being configured to send client events to the
22 respective client at the dynamically determined rate.

1 20. **(Original)** The system of claim 19 wherein the performance
2 characteristics comprise network transmission time and a client processing speed
3 time for received client events.

4
5 21 **(Previously Presented)** The system of claim 17, wherein the queue
6 manager is further configured to:

7 identify events to be transmitted to the respective client which are related to
8 a common data object; and

9 initiate an aggregation of the identified events to thereby reduce the
10 number of client events in the queue.

11
12 22. **(Original)** The system of claim 21, wherein the identified events
13 are aggregated into at most one event.

14
15 23. **(Original)** The system of claim 21, wherein:

16 each state event received by the queue manager has associated aggregation
17 functionality; and

18 the queue manager is configured to initiate aggregation by executing the
19 aggregation functionality associated with a received state event when the client
20 event queue contains a queued event related to data object common to the
21 received state event.

22
23 24. **(Original)** The system of claim 17, wherein each client profile
24 comprises at least one client folder, each client folder comprising data
25

1 indicating at least one subscribed data stream and containing object rules
2 associated with the subscribed data stream;

3 the client session being configured to evaluate the object rules associated
4 with the particular input data stream for each folder in the client profile
5 indicating a subscription to that stream.

6
7 25. (Original) The system of claim 17, further comprising a state
8 dispatch module configured to:

9 receive requests for the current state of a set of data objects from
10 a requestor;

11 obtain current state information for the data objects in the set;

12 and

13 return the current state information to the requestor.

14
15 26. (Original) The system of claim 25, wherein:

16 the object state manager is configured to request from the state dispatch
17 module a current state of a set of data objects carried on a connected input data
18 stream upon first connecting to that input data stream;

19 the returned current state information being used to initialize the respective
20 object cache for the object state manager.

21
22 27. (Original) The system of claim 26, wherein the object state
23 manager further comprises an update queue, the object state manager being
24 further configured to place current states received from the input data stream on
25

1 the update queue during a pendency of the request and apply the queued current
2 states to data in the object cache after cache initialization is complete.

3
4 28. (Original) The system of claim 26, wherein the state dispatch
5 module is connected to at least one offer pool maintained by a transmitter of the
6 data streams received object state managers and configured to obtain current
7 state information from an appropriate offer pool.

8
9 29. (Original) The system of claim 17, wherein the data objects
10 carried on the input data streams comprise differential data objects.

11
12 30. (Original) The system of claim 17, wherein the data objects
13 comprise information related to financial product offerings.

14
15 31. (Original) The system of claim 17, wherein the client session
16 manager is further configured to, after a communication session is established
17 with a particular client, deliver to the particular client a snapshot of the data
18 objects in the object pool cache associated with the data stream subscriptions in
19 the profile associated with the particular client.

20
21 32. (Original) The system of claim 17, wherein the client session
22 manager is further configured to in response to detecting that a particular client
23 in a communication session has subscribed to a new input data stream not
24
25

1 presently connected to one of the at least one object state managers, activate a
2 new object state manager to support the new input data stream.

3
4 33. **(Previously Presented)** The system of claim 17, further
5 comprising an HTTP Tunneling transport module connected between the
6 delivery manager and the respective client.

7
8 34. **(Original)** The system of claim 17 further comprising at least one
9 information manager receiving raw object data streams from at least one content
10 provider and generating the input data streams.

11
12 35. **(Original)** The system of claim 34, wherein each information
13 manager further comprises a structured object pool containing a current state of
14 the data objects carried on the input data streams, the object events on the input
15 data streams representing differential changes to the state of particular data
16 objects.

17
18 36. **(Original)** The system of claim 34, wherein the data objects
19 carried on a particular input data stream are of a common type.

20
21 37. **(Previously Presented)** A system for processing information
22 related to financial product offerings and delivering real-time offer updates to a
23 plurality of clients via a data communication network, the information being
24 included in data objects carried on at least one input data stream and
25

1 representing changes in state of particular product offerings, the data streams
2 being transmitted by at least one information manager having a respective offer
3 pool containing current states of the product offerings, the system comprising:

4 at least one object state manager, each object state manager connected
5 to a respective data input stream, comprising an associated object cache and
6 subscriber data indicating subscribers to the respective data input stream, and
7 configured to:

8 receive a data object on the connected input data stream
9 related to a specific product offering,

10 update the state of the specific product offering in associated object
11 pool cache in accordance with the state changed indicated in the received data
12 object,

13 generate an object event directed to subscribers of the respective data
14 input stream indicating the state change for the specific product offering in
15 accordance with the subscriber data;

16 a plurality of client session modules, each client session module being in
17 communication with a respective client and configured to:

18 receive object events generated by object state managers
19 connected to an input data stream to which the respective client has subscribed,

20 upon receiving an object event, evaluate client object rules against
21 the object event, the object rules selected in accordance with the particular data
22 stream associated with the object event, and
23
24
25

1 generate a state event from the object event indicating the changed
2 state of the specific data object to the respective client in response to a positive
3 evaluation;

4 a plurality of delivery managers, each delivery manager comprising:
5 a client event queue for containing events to be transmitted to the
6 respective client;

7 a queue manager configured to place events on the queue in
8 accordance with received state events; and

9 a push module configured to retrieve events from the client
10 event queue and send appropriate client events to the respective client;

11
12 each delivery manager being associated with a respective client session
13 module and configured to:

14 receive state events generated by the associated client session
15 module, and

16 send client events derived from the received state events to the
17 respective client; and

18 a client session manager having access to a plurality of client profiles, each
19 client profile containing data stream subscription information and related client
20 object rules, the client manager configured to:

21 receive an initial communication from a new client;

22 associate the new client with a new client session module;

23 retrieve the client profile associated with the new client;

1 identify a set of data stream subscriptions indicated in the client
2 profile; and

3 add the new client session module to the subscription data for each
4 object state manager connected to an input data stream to which the new client is
5 subscribed.

6
7 38. (Cancelled)

8
9 39. (Previously Presented) The system of claim 37, wherein at least
10 one of the client session and the push module are configured to monitor the
11 performance characteristics for communications with the respective client and
12 dynamically determine a rate at which client events should be transmitted in
13 response to the monitored characteristics;

14 the push module being configured to send client events to the
15 respective client at the dynamically determined rate.

16
17 40. (Previously Presented) The system of claim 39 wherein the
18 performance characteristics comprise network transmission time and a client
19 processing speed time for received client events.

20
21 41. (Previously Presented) The system of claim 37, wherein
22 the queue manager is further configured to:

23 identify a queued event related to a data object common to a received state
24 event; and

25 initiate an aggregation of the state event and identified queued event.

1
2 42. **(Previously Presented)** The system of claim 41, wherein:
3 each state event received by the queue manager has associated aggregation
4 functionality; and

5 the queue manager is configured to initiate aggregation by executing
6 the aggregation functionality associated with the received state event.
7

8 43. **(Original)** The system of claim 37, further comprising:
9 a state dispatch module in communication with the information manager
10 and the object caches associated with the object state managers and configured to
11 receive a state data request as input from a requestor, retrieve the current states of
12 particular product offerings in accordance with the request, and return the current
13 states to the requestor.
14

15 44. **(Previously Presented)** The system of claim 43, wherein the object
16 state manager is further configured to, upon first connecting to the respective
17 input data stream, send a request to the state dispatch module to obtain the current
18 states of product offerings carried on the respective data stream, the obtained
19 currents states being used to initialize the associated object cache.
20

21 45. **(Original)** The system of claim 44, wherein the client manager
22 is further configured to send a request to the state dispatch module to obtain the
23 current states of product offerings carried on input data streams to which the
24 new client is subscribed and initiate the return of at least a portion of the
25

1 obtained current states to the new client.

2
3 46. (Original) The system of claim 37, wherein the client
4 manager is further configured to:

5 identify an unconnected data stream specified in the client profile associated
6 with the new client; and

7 initiate a connection to the unconnected data stream from a new object state
8 manager.